

CLAIMS

1. A method of manufacturing an optical sheet, said method comprising the steps of:

cooling a molten thermoplastic resin base of a thermoplastic resin to obtain a flexible thermoplastic resin base having a surface temperature not higher than a glass transition point of the thermoplastic resin and an internal temperature not lower than the glass transition point thereof;

coating one of surfaces of the flexible thermoplastic resin base with a radiation-curable resin;

pressing the flexible thermoplastic resin base against a radiation-curable resin shaping roller such that the radiation-curable resin coating the thermoplastic resin base is pressed against a circumference, formed in a raised die pattern, of the radiation-curable resin shaping roller and the raised die pattern formed in the circumference of the radiation-curable resin shaping roller is imparted to the surface of the radiation-curable resin to form a first optical structure having a surface shape complementary to the raised die pattern of the radiation-curable resin shaping roller; and

curing the first optical structure by irradiating the first optical structure of the radiation-curable resin formed on the thermoplastic resin base with radiation.

2. The method according to claim 1, further comprising the step of forming a film having high adhesion to both the thermoplastic resin and the radiation-curable resin on a surface of the flexible thermoplastic resin base on which the first optical structure is to be formed.

3. The method according to claim 1, wherein the first optical structure formed by the radiation-curable resin shaping roller has a surface shape corresponds to that of at least one of optical structures including a Fresnel lens, a lenticular lens, a prism structure, a matte structure, a hairline structure and a diffraction grating structure.

4. The method according to claim 1, wherein the molten thermoplastic resin base is cooled by passing the molten

thermoplastic resin base between a pair of cooling rollers.

5. The method according to claim 4, further comprising the step of forming a second optical structure having a surface shape complementary to a surface shape of a raised die pattern formed on a circumference of one of the pair of cooling rollers, the one cooling roller serving as a forming roller and cooling the other surface of the flexible thermoplastic resin base opposed to a surface on which the first optical structure is formed, by imparting the surface shape of the raised die pattern of the cooling roller serving as the forming roller to the surface of the flexible thermoplastic resin base.

6. The method according to claim 1, wherein the step of forming the first optical structure regulates a temperature of the thermoplastic resin base through a control of a temperature of the radiation-curable resin shaping roller.

7. The method according to claim 1, further comprising the step of regulating a temperature of the thermoplastic resin base separated from the radiation-curable resin shaping roller.

8. The method according to claim 5, wherein the respective axial positions of at least either of the radiation-curable resin shaping roller and the one cooling roller serving as the forming roller are adjustable.

9. The method according to claim 5, wherein the raised die pattern formed on the cooling roller serving as the forming roller has a pattern element having a substantially circular or elliptic cross section.

10. An optical sheet comprising: a transparent, thermoplastic resin base formed of a thermoplastic resin that is rigid at a temperature not higher than a glass transition point thereof; and a first optical structure formed on one of surfaces of the thermoplastic resin base;

wherein the first optical structure is formed by shaping a material for forming the first optical structure together with the flexible thermoplastic resin base having a surface temperature not higher than the glass transition point and an internal temperature not lower than the glass transition point by a

forming roller.

11. The optical sheet according to claim 10, wherein the material forming the first optical structure is a radiation-curable resin.

12. The optical sheet according to claim 11, further comprising a film formed on a surface, on which the first optical structure is formed, of the thermoplastic resin base and having high adhesion to both the thermoplastic resin and the radiation-curable resin.

13. The optical sheet according to claim 10, further comprising a second optical structure formed on the other surface of the flexible thermoplastic resin base opposed to a surface on which the first optical structure is formed.

14. The optical sheet according to claim 13, wherein the flexible thermoplastic resin base is formed by passing a molten thermoplastic resin between a pair of cooling rollers and cooling the molten thermoplastic resin by the pair of cooling rollers, and the second optical structure is formed by using one of the pair of cooling rollers, cooling the other surface of the flexible thermoplastic resin base opposed to the surface on which the first optical structure is formed as a forming roller.

15. The optical sheet according to claim 10, wherein the thermoplastic resin base has a plurality of thermoplastic resin layers.

16. The optical sheet according to claim 15, wherein at least one of the plurality of thermoplastic resin layers contains a diffusing material.

17. The optical sheet according to claim 10, wherein the first optical structure includes at least one optical element selected from a group of a Fresnel lens, a lenticular lens, a prism structure, a matte structure, a hairline structure and a diffraction grating structure.